

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### A Battery-driven Locomotive for Use in Mining

We, ERICH BACHEM, of Waldsaum 2, Muehlheim (Ruhr), and KARL BYRANS DYCKERHOFF, of Wetzmuehlenstrasse 30, Muehlheim (Ruhr), Germany, both German Citizens and trading as Ruhrthaler Maschinenfabrik Schwarz & Dickerhoff K.G., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a battery driven locomotive for use in mining.

It would appear that in the special conditions existing in mining, in particular the problem of ventilation, diesel locomotives are often less suitable than electrically driven traction engines.

However, in mines where there is a risk of fire damp, electric locomotives fed from a live cable cannot be used, or only to a limited extent, because of the unavoidable sparking, and in such cases electric locomotives drawing their requisite energy from one or more storage batteries which they carry with them are to be preferred.

Electric locomotives of this type, known as storage locomotives, are already in normal service above ground, for example in railway shunting yards, the batteries being mounted on the chassis, in front of and behind the driver's cab, and being enclosed in a casing to protect them against damage from mechanical causes or from the effects of the weather.

However, for use underground, because of official conditions laid down for protection against fire-damp, the storage batteries or accumulators mounted on the traction engine, which are generally interchangeable, must be encased in an air-tight and moisture-proof manner.

In the normal construction of mine locomotives driven by storage batteries or accumulators, the batteries, which have a size of

plate determined by the working conditions, are housed in a case adapted to be sealed by a cover plate, the battery case being removably mounted on the chassis frame in front of the driver's cab. Since, having regard to the total height permissible in respect of the dimensions of the gallery, the driver's cab projects only very slightly above the battery-case, the driver's view of the section of rail lying ahead of him in the direction of travel is thereby considerably impeded.

This disadvantage is obviated according to the invention by mounting the cells in front of the driver's cab so that at least three of them are arranged in mutually descending relationship toward the leading side of the locomotive.

This is preferably achieved by mounting an essentially quadrangular trough shaped battery case so that it is inclined as a whole towards the leading side of the locomotive. Such an arrangement is possible because the wheel base of mine locomotives is relatively short and the superstructure projects fore and aft beyond the axles of the wheels. Since the separate cells are sealed in air-tight manner, their slightly inclined position is immaterial.

Improved visibility may also be achieved by mounting the separate cells, at least in the front part of the case container, so that they descend step-wise towards the leading side of the locomotive. For this purpose the base of the case is itself preferably of stepped construction, at least in its front portion. The shape of the lid of the case may be adapted to fit this form of base.

The invention may also be carried out by reducing towards the leading side of the locomotive, the constructional height of the cells housed in the appropriate battery cases.

The object of the invention may, of course, also be achieved in locomotives having cases mounted on either side of the driver's cab.

[Price 3s. 6d.]

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If need be, improved visibility may also be achieved by reducing the length of the cases.

In another way of carrying out the invention there are mounted in positions with reference to the direction of travel, on one side of the driver's cab, which is provided centrally of the locomotive, a battery case containing the cells, and mounting the driving motor and gears on the other side of the driver's cab.

Embodiments of the invention are diagrammatically illustrated by way of example in the drawings, in which:—

Figure 1 shows the present normal construction of a mine locomotive with restricted visibility.

Figure 2 shows a locomotive with an inclined battery case,

Figure 3 shows a locomotive in which the leading cells are arranged in steps in a case which, in this instance, is in two sections,

Figure 4 shows a locomotive in which all the cells in the case are in stepped arrangement,

Figure 5 shows a locomotive with a two-part battery case, the two parts being in stepped arrangement, and

Figure 6 shows a locomotive with cases mounted on both sides of the driver's cab, and in which the cells are in stepped arrangement.

As may be seen from the drawings, in the arrangement, according to the invention, of the battery case on the locomotive, according to Figures 2 to 6, the angle of vision  $\beta$  is considerably greater than the angle of vision  $\alpha$  in the known arrangement (Figure 1).

#### WHAT WE CLAIM IS:—

1. A battery-driven locomotive, in particular for use in mines, having a multiplicity of cells mounted in front of the driver's cab, wherein at least three of the cells are arranged in mutually descending

relationship toward the leading side of the locomotive.

2. A locomotive according to Claim 1, characterised in that an essentially quadrangular storage battery-case containing the separate battery cells is inclined as a whole towards the leading side of the locomotive.

3. A locomotive according to Claim 1, characterised in that the separate battery cells, at least in the front section of the battery case, are arranged to descend stepwise towards the leading side of the locomotive.

4. A locomotive according to Claims 1 and 3, characterised in that the base of the battery case is of stepped construction at least in its front section.

5. A locomotive according to Claims 1, 3 and 4, characterised in that the cover plate of the battery case is also of stepped construction.

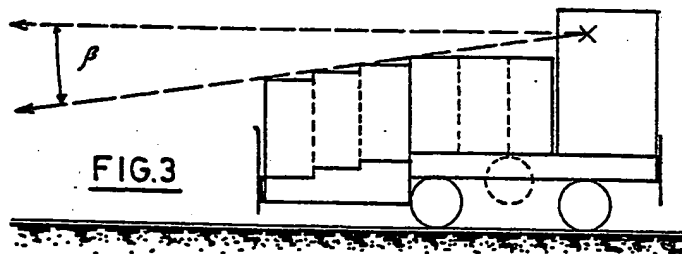
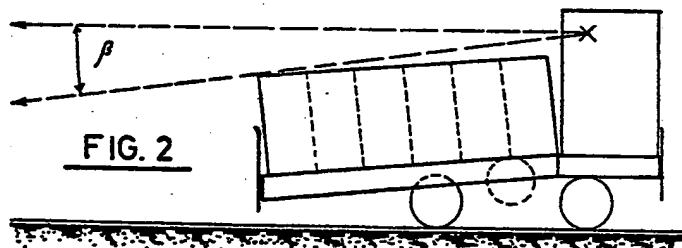
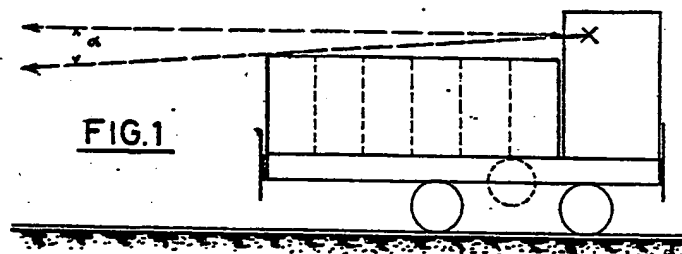
6. A locomotive according to Claim 1, characterised in that the individual cells of the battery are of a height which decreases towards the leading side of the locomotive.

7. A locomotive according to Claims 1 to 6 having battery cells mounted on both sides of a driver's cab located centrally of the locomotive.

8. A locomotive according to Claims 1 to 6, characterised in that on one side of a driver's cab located centrally of the locomotive there is mounted a storage battery case whilst the driving motor and the gears are mounted on the other side of the driver's cab.

9. A battery-driven locomotive substantially as described herein with reference to the accompanying drawings.

R. G. C. JENKINS & CO.,  
Chartered Patent Agents,  
1, Quality Court, Chancery Lane,  
London, W.C.2,  
Agents for the Applicants.



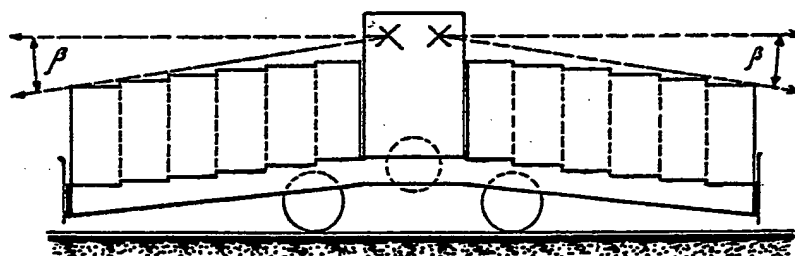
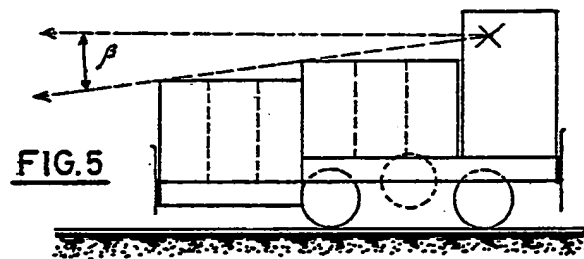
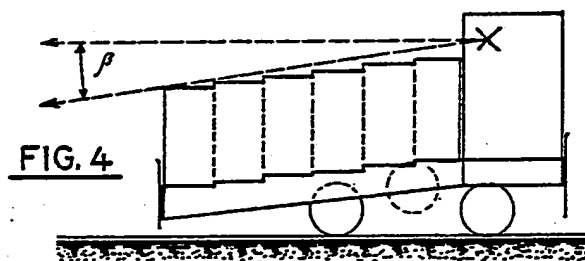
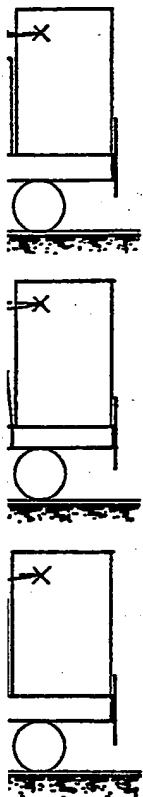
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COMPLETE SPECIFICATION

2 SHEETS

*This drawing is a reproduction of  
the Original on a reduced scale*

Sheets 1 & 2



**FIG. 6**

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 the Original on a reduced scale  
 2 SHEETS Sheets 1 & 2

